Nevada Test Site

Stockpile Stewardship Program February 2003

Introduction

The program rests on developing an unprecedented set of scientific tools to better understand nuclear weapons, on significantly enhancing our surveillance capabilities, and on completing a new manufacturing program needed to extend the life of our nuclear weapons. The program has also allowed the Secretaries of Defense and Energy to certify that the nuclear stockpile remains safe and reliable and that nuclear testing is not needed at this time.

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Establishment of Program

The Stockpile Stewardship Program was established in response to the Fiscal Year 1994 National Defense Authorization Act (P.L. 103-160) which called on the Secretary of Energy to "establish a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in weapons."
In the absence of nuclear testing, the Stockpile Stewardship Program must: 1. Support a focused, multifaceted program to increase the understanding of the enduring stockpile; 2. Predict, detect, and evaluate potential problems due to the aging of the stockpile; 3. Refurbish and re-manufacture weapons and components, as required; and 4. Maintain the science and engineering institutions needed to support the nation's nuclear deterrent, now and in the future.

As the civilian steward of the nation's nuclear weapons complex, the U.S. Department of Energy (DOE) is responsible for the safety and reliability of the nation's nuclear arsenal to the nation. The U.S. Department of Defense (DoD) partners with the DOE in setting requirements and establishing production goals. A key challenge to the Stockpile Stewardship Program is to balance military weapon performance goals against civilian and military surety and safety concerns.

Campaigns

Campaigns are technically challenging, multi-year, multi-functional efforts conducted at the Defense Programs laboratories, production plants, and at the Nevada Test Site. The goal is to provide the capabilities needed to address current and future stockpile issues by employing world class scientists and engineers, and by providing the most advanced scientific
and engineering infrastructure.

Maintaining Test Readiness

The U.S. Department of Energy has been directed by the President to maintain an underground test readiness program in case it is in the "supreme national interest" to resume nuclear weapons testing. Key and critical positions are identified for the functional areas necessary to safely execute an underground test. Overall readiness is supported by experimental programs conducted at the test site. In particular, test readiness at the Nevada Test Site is critically dependent on the Campaigns and laboratory-based experiments that exercise high-bandwidth recording and advanced diagnostic development that are not required for subcritical experiments.

Assessment and Certification

In the absence of nuclear testing, different experiments and tools must be relied upon to obtain data relevant to nuclear warhead performance. A suite of enhanced capabilities and facilities have been developed that are being used to fill in the knowledge gaps and to provide data relevant to the various stockpile concerns that have been identified. This approach has enabled DOE to successfully address stockpile issues that have emerged to date. However, as the stockpile ages, it is anticipated that more difficult assessment issues will arise. In addition, it is possible that, as in past cases, design and production flaws will be discovered in systems that have been in the stockpile for some time.

Program Thrusts

The DOE's weapon laboratories are engaged in a balanced and integrated program of computational simulation, fundamental scientific research and experiments. Non-nuclear experiments, e.g., subcritical experiments, are being used to assess weapon component performance. Together with past nuclear test results, they are also being used to validate computer simulations, which rely heavily on fundamental scientific research as a source of data and a basis for the detailed physics models in the codes. Once validated, weapons physics simulations will guide the judgements made about integral stockpile issues.

Experimental Facilities

Among the many experimental facilities being used by the weapon laboratories is the U1a Facility at the Nevada Test Site, where subcritical experiments have been conducted since July 2, 1997. Test data from these experiments will help maintain the reliability of the nuclear weapons stockpile by allowing scientists to gain more knowledge of the dynamic properties of aging nuclear materials.

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